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EXAMINER
BAKER, STEPHEN M

ART UNIT	PAPER NUMBER
2133	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/767,453	TAKEHARA, SHINTARO
	Examiner	Art Unit	
	Stephen M. Baker	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 April 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some *   c)☐ None of:

         1.☒ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
     Paper No(s)/Mail Date <u>41906,70604,13004</u>.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

Specification

1.   The title of the invention is not descriptive. A new title is required that is clearly

indicative of the invention to which the claims are directed.

The following title is suggested: "Information Reproducing Apparatus and Method

with Correction of Equalized Signal Levels."

2.   The disclosure is objected to because of the following informalities:

In paragraph 0009, "a bitstream includes shortest contiguous bits such as 2T" is

poorly worded and apparently should be "a bitstream includes contiguous bits

conforming to a minimum run-length constraint such as a length of 2T" or the like, "a

deviation is caused between the reference level and the peak level of the equalized

signal in shortest contiguous bits of, for example, 2T" apparently should be "a deviation

is caused between the reference level and the level of the equalized signal produced by

a minimum run-length sequence of, for example, length 2T" or the like, and "a rear

stage" apparently should be "a following stage" or the like.

In paragraph 0030, "cause peak levels LP2 and LP4 in central portions of the

histogram for determining 2T or the like to have potentials substantially matching

reference levels LV2 and LV4, respectively" apparently should be "cause levels LP2 and

LP4 corresponding to peaks in a central portion of the histogram generated by run-

lengths of 2T or the like to have potentials substantially matching reference levels LV2

and LV4, respectively" or the like, and "errorneous" apparently should be "erroneous."

In paragraph 0063, "and the reference levels" (three occurrences) apparently should be "to the reference levels" or the like.

In paragraph 0064, "provide the information reproducing apparatus and the information reproducing method" apparently should be "provide an information reproducing apparatus and method" and "amount of expansion of each of equalized signal waveforms at the reference levels" apparently should be "amount of expansion between equalized signal histogram peaks corresponding to the reference levels" or the like.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4.   Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is prolix in parts, the preamble is poorly worded, the coupling of the "correcting section" with respect to the rest of the claimed elements is vague in view of well-known prior art, and apparently should be amended as follows:

> 1.   An information reproducing apparatus for performing maximum-likelihood decoding ~~by reading out information recorded on a recording medium~~, comprising:
> a detecting section which detects information recorded in the recording medium and which outputs a reproduction signal;

an equalizing section which performs partial response equalization of ~~a detection signal detected by the detecting section~~ the reproduction signal and which outputs an equalized signal;

a correcting section which corrects the potential of the equalized signal ~~output from the equalizing section~~ in accordance with a correction amount determined on the basis of a plurality of reference levels ~~that is~~ used for the maximum-likelihood decoding, to produce a corrected equalized signal; and

a maximum-likelihood decoding section which performs maximum-likelihood decoding of the corrected equalized signal by referencing the plurality of reference levels, ~~in accordance with the equalized signal corrected by the correcting section~~, and which outputs a ~~decoding~~ decoded signal.

Claim 2 is prolix in parts, inconsistent, and not entirely in idiomatic English, and apparently should be amended as follows:

2.   An information reproducing apparatus according to claim 1, wherein, ~~when~~ representing the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding ~~are represented~~ by LV(1), LV(2), . . , LV(n-1), and LV(n) in sequence from the ~~lower~~ lowest level, and ~~when~~ representing a plurality of ~~peak~~ levels for peaks in a histogram of equalized signals and that correspond to the reference levels ~~and that are output from the equalizing section are represented~~ by LP(1), LP(2), . . . , LP(n-1), and LP(n) in sequence from the peak level whose ~~corrected~~ value is ~~smaller~~ smallest, the correction amount is determined by the correcting section to ~~be~~ generate a value ~~that satisfies at least~~ satisfying one of:

$$LP(1) = LV(1) - \alpha \text{ (where } \alpha \text{ is a constant)}; \text{ and}$$
$$LP(n) = LV(n) + \alpha;$$

and in accordance with the correction amount, the correcting section ~~changes a signal amplitude of~~ corrects ~~the~~ a corresponding equalized signal ~~corresponding to the reference~~ level.

Claim 3 is prolix in parts and not entirely in idiomatic English, and apparently should be amended as follows:

3.   An information reproducing apparatus according to claim 2, wherein ~~the correction amount to be determined by the correcting section is a value determined such that~~ the constant α is the same as a value LVd ~~represented by each interval~~ equal to each of the intervals between the

plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding.

Claim 4 is prolix in parts, inconsistent, and not entirely in idiomatic English, and apparently should be amended as follows:

> 4.   An information reproducing apparatus according to claim 1, wherein the correction amount ~~to be determined by the correcting section~~ is a value determined such that at least one of <u>the</u> corrected values of the plurality of ~~peak~~ levels <u>for peaks</u> in ~~the~~ <u>a</u> histogram of the equalized signals ~~that correspond to the reference levels and that are output from the equalizing section~~ matches <u>at least one of the</u> values of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding.

Claim 5 is inconsistent, and not entirely in idiomatic English, and apparently should be amended as follows:

> 5.   An information reproducing apparatus according to claim 1, wherein the correction amount ~~to be determined by the correcting section~~ is a value determined such that at least one of <u>the</u> corrected values of the plurality of ~~peak~~ levels <u>for peaks</u> in ~~the~~ <u>a</u> histogram of the equalized signals that correspond to left and right reference levels adjacent to a central reference level <u>used for the maximum-likelihood decoding</u> matches <u>at least one of the</u> values of the left and right reference levels adjacent to the central reference level ~~of the plurality of reference levels that are used for the maximum-likelihood decoding~~.

Claim 6 is inconsistent, and not entirely in idiomatic English, and apparently should be amended as follows:

> 6.   An information reproducing apparatus according to claim 1, wherein when <u>levels for peaks in</u> a histogram of the equalized signals ~~has an asymmetric~~ <u>have a</u> distribution <u>asymmetric</u> ~~including a fine portion and a coarse portion~~ with respect to ~~a peak level corresponding to~~ a central reference level <u>of</u> the <u>plurality of</u> reference levels <u>used for the maximum-likelihood decoding, such that the distribution has a fine portion and a coarse portion</u>, the correction amount ~~to be determined by the correcting section~~ is a value determined such that~~, in~~ <u>of</u> left and right reference levels adjacent to the central reference level of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding, a value of the reference level on the side where the distribution includes the fine portion

matches a corrected value of a <u>corresponding</u> peak level ~~corresponding to~~
~~the value of the reference level~~.

Claim 7 is elliptical in parts, inconsistent, and not entirely in idiomatic English,

and apparently should be amended as follows:

> 7.   An information reproducing apparatus according to claim 1, wherein
> the correction amount ~~to be determined by the correcting section~~ is a
> value determined such that <u>at least one of</u> reference levels provided at
> second left and right ~~portions from~~ <u>displacements from</u> a central reference
> level of the plurality of reference levels ~~that are~~ used for the maximum-
> likelihood decoding matches at least one of <u>the</u> corrected values of a
> plurality of <u>corresponding</u> ~~peak~~ levels <u>for peaks in a histogram</u> of the
> equalized signals ~~corresponding to the reference levels provided at the~~
> ~~second left and right portions from the central reference level~~.

Claim 8 is inconsistent, and not entirely in idiomatic English, and apparently

should be amended as follows:

> 8.   An information reproducing apparatus according to claim 1, wherein
> when <u>levels for peaks in</u> a histogram of the equalized signals ~~has an~~ <u>have</u>
> <u>a distribution</u> asymmetric ~~component distribution including a fine portion~~
> ~~and a coarse portion~~ with respect to a peak level corresponding to a
> central reference level the reference levels, <u>including a fine portion and a</u>
> <u>coarse portion,</u> the correction amount ~~to be determined by the correcting~~
> ~~section~~ is a value determined such that, in reference levels provided in
> second left and right portions of the plurality of reference levels ~~that are~~
> used for the maximum-likelihood decoding, a value of the reference level
> on the side where the distribution includes the fine portion matches a
> corrected value of a <u>corresponding</u> peak level ~~corresponding to the value~~
> ~~of the reference level~~.

Claim 9 is inconsistent, and not entirely in idiomatic English, and apparently

should be amended as follows:

> 9.   An information reproducing apparatus according to claim 1,
> wherein, ~~when~~ <u>representing</u> the plurality of reference levels ~~that are~~ used
> for the maximum-likelihood decoding ~~are represented~~ by LV(1), LV(2), . . ,
> LV(n-1), and LV(n) in sequence from the ~~lower~~ <u>lowest</u> level and ~~when~~
> <u>representing</u> a plurality of ~~peak~~ levels <u>for peaks</u> in a histogram of
> equalized signals <u>and</u> that correspond to the reference levels ~~and that are~~

~~output from the equalizing section are represented~~ by LP(1), LP(2), . . . , LP(n-1), and LP(n) in sequence from the peak level whose corrected value is ~~smaller~~ smallest, a value LVd ~~represented by each interval~~ equal to the intervals between the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding is used to perform ~~output~~ restriction ~~for~~ of the equalized ~~signals~~ signal values to ~~signals in~~ a range between LP(1) - ½·LVd and LP(n) + ½·LVd.

Claim 10 is not entirely in idiomatic English, and apparently should be amended as follows:

> 10.   An information reproducing apparatus according to claim 1, wherein the correcting section ~~perform~~ performs correction by using a variable gain amplifier whose amplification factor can be changed ~~corresponding to~~ by an external ~~signals~~ signal.

Claims 11-20 apparently require corrections analogous to those suggested above for claims 1-10.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claims 1, 2, 4, 5-7, 10-12, 14, 15-17 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Patent No. 6,618,338 to Fujiwara *et al* (hereafter "Fujiwara").

Fujiwara discloses arrangements for equalizing and decoding a signal read from a recording medium. Fujiwara provides (Fig. 2) a "detecting section" (not shown) which outputs a "reproduction signal" (reproduced signal) to a low-pass filter (22), an "equalizing section which performs partial response equalization" (24), a "correcting section which corrects the potential of the equalized signal" (200), and a "maximum likelihood decoding section" (100). Reference levels used by Fujiwara's "maximum likelihood decoding section" (100) are levels corresponding to ideal PR-equalized signal values (column 23, lines 7-11). Fujiwara's "equalizing section which performs partial response equalization" (24) is controlled responsive to errors in levels of peaks in a histogram of equalized signal levels, the errors being differences from ideal PR-equalized signal levels (column 22, lines 48+). Accordingly, Fujiwara's "correcting section" (200) in effect "corrects the potential of the equalized signal output from the equalizing section in accordance with a correction amount determined on the basis of a plurality of reference levels that is (sic) used for the maximum-likelihood decoding."

Regarding claims 2 and 12, Fujiwara's correction operation has a correction increment (coarse or fine), which can be considered to correspond to "α" in the recited equations.

Regarding claims 4 and 14, Fujiwara's correction operation is applied to all the histogram peak levels, in correcting subsequent equalized levels to match expected ideal levels.

Regarding claims 5, 6, 15 and 16, Fujiwara's correction operation is applied to all the histogram peak levels, which includes peaks corresponding to "left and right levels

adjacent to a central reference level", in correcting subsequent equalized levels to

match expected ideal levels. Figures 35 and 37 show the distribution of peaks may be

asymmetric, with "fine" and "coarse" spacing portions on opposite sides of the center

level.

Regarding claims 7 and 17, Fujiwara's correction operation is applied to all the

histogram peak levels, which for five levels, includes peaks corresponding to "second

left and right portions (sic) from a central reference level", in correcting subsequent

equalized levels to match expected ideal levels.

Regarding claims 10 and 20, Fujiwara further teaches adjusting reproduction

power (column 16, lines 17-24), presumably involving adjustment of a "variable gain

amplifier."

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Fujiwara.

Fujiwara does not show an asymmetric distribution with levels at "second left and

right (offsets) from a central reference level" such as an asymmetric distribution for a

five-level equalized signal. It would have been obvious to apply the equalization output

level corrections disclosed by Fujiwara to an equalized signal with an asymmetric

distribution and with levels at "second left and right (offsets) from a central reference

level" (e.g. with five levels). Such an application would have been obvious because

Fujiwara already teaches correcting a five-level equalized signal and an equalized

signal with an asymmetric distribution of levels.

Allowable Subject Matter

9.   Claims 3, 9, 13 and 19 would be allowable if rewritten to overcome the

rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to

include all of the limitations of the base claim and any intervening claims.

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

11.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Stephen M. Baker whose telephone number is (571)

272-3814. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30

PM).

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen M. Baker
Primary Examiner
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smb